

THREE NEW SPECIES OF THE SUBGENUS *ZEUGODACUS* FROM YUNNAN, CHINA (DIPTERA, TEPHRITIDAE)

YU Hui^{1,2}, BAI Yong-Hua³, HE Wan-Zhong⁴, LIU Zhong-Shan⁵, YANG Ding^{2*}

1. Institute of Animal and Plant Quarantine, Chinese Academy of Inspection Quarantine, Beijing 100029, China

2. Department of Entomology, China Agricultural University, Beijing 100193, China

3. Mengla Entry-Exit Inspection and Quarantine Bureau, Yunnan 666300, China

4. Hekou Entry-Exit Inspection and Quarantine Bureau, Hekou 661300, China

5. Yunnan Entry-Exit Inspection and Quarantine Bureau, Kunming 650228, China

Abstract We studied the specimens of the subgenus *Zeugodacus* collected from Yunnan and recognized 3 new species, *B. (Z.) apicinigra* Yu, Bai et Yang, sp. nov., *B. (Z.) hekouana* Yu, He et Yang, sp. nov., *B. (Z.) mengiana* Yu, Liu et Yang, sp. nov. The type specimens are deposited in the Chinese Academy of Inspection and Quarantine (CAIQ), Beijing.

Key words Diptera, Tephritidae, new species, Yunnan, China.

Zeugodacus Hendel, 1927 is a large subgenus in the genus *Bactrocera* Macquart. There are 79 known species of the subgenus *Zeugodacus* in the world (Thompson, 1998). Twenty seven species are known from China (Wang, 1996). The subgenus *Zeugodacus* can be recognized by the following characters: chaetotaxy of head and thorax reduced, lacking ocellar, postocellar, dorsocentral, katepisternal and postpronotal setae; anterior supra-alar and prescutellar acrostichal setae present; two pairs of scutellar setae; abdominal tergites not fused; pecten of cilia present on tergite 3 of male; sternite 5 of male slightly concave on posterior margin; posterior lobe of surstyli long (Drew, 1989; Wang, 1996).

The general terminology follows White *et al.* (1999). Genitalic preparations were made by macerating the apical portion of the abdomen in cold saturated NaOH for 12–14 h. After maceration, genitalia were examined in fresh glycerine and stored in a small tube pinned below the specimen. The following abbreviations are used: a spal s-anterior supraalar seta, fr s-frontal seta, gn s-genal seta, i al s-intra-alar seta, i vt s-inner vertical seta, npl s-notopleural seta, orb s-orbital seta, o vt s-outer vertical seta, pprn s-postpronotal seta, pscl acr s-prescutellar acrostichal seta, pal s-posterior supraalar seta, scap s-scapular seta, scl s-scutellar seta.

Bacterodacus (*Zeugodacus*) *apicinigra* Yu, Bai et Yang, sp. nov. (Figs 1–9)

Description. Male. Body length 6.9–7.6 mm, wing length 6.4–6.7 mm.

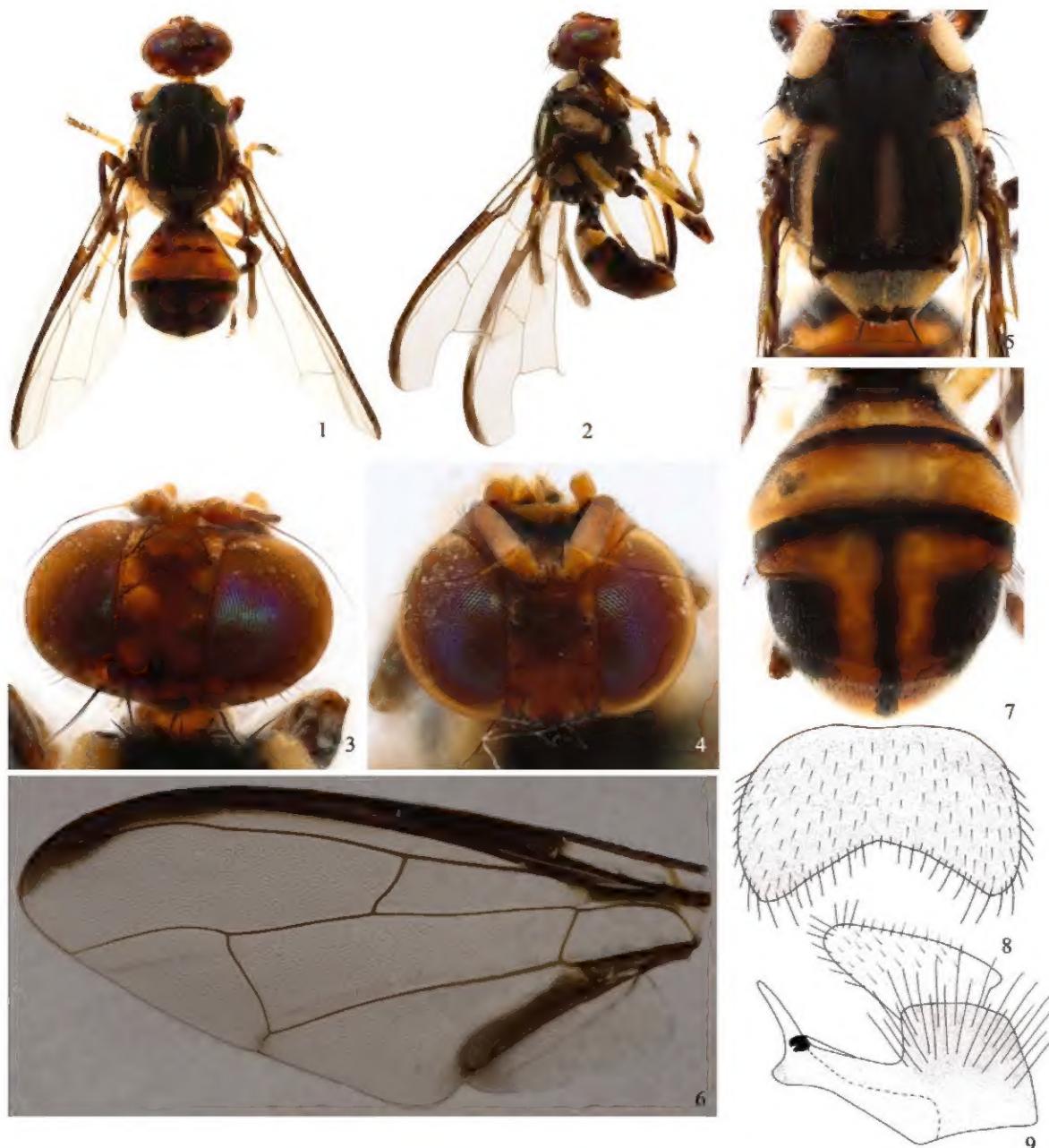
Head (Fig. 3) fulvous. Frons fulvous, anteromedially with fuscous hump and a few short

setulae on hump; ocellar triangle black; a dark brown mark extending across vertex and connecting with ocellar triangle; lunule fulvous; face (Fig. 4) fulvous with a broad black band; gena fulvous; a dark brown spot below each eye; occiput fulvous to black, but yellow along eye margins. Setulae and setae on head black; 3 fr s, 1 orb s, with dark brown spots at base of fr s and orb s; 1 i vt s, 1 o vt s and 1 gn s. Occipital row with some black setae. Antenna yellow except segment 3 fulvous on apex and outer surface; segment 1 with a few black setulae dorsally, segment 2 with some black hairs and 1 black seta, segment 3 3–4 times longer than wide; arista bare, black but yellow basally; length of antennal segments: 0.09 mm, 0.29 mm, 0.81 mm. Proboscis and palpus fulvous.

Thorax (Fig. 5). Scutum shining black in ground color, postpronotal lobes entirely yellow. Pleura predominantly black with following yellow markings: notopleuron, medium anepisternal stripe, small spot on katepisternum, upper portion of anatergite and katatergite, median postsutural vitta and lateral vittae. Two mid lateral vittae parallel, ending at base of i al s and connecting with yellow mark on each side before suture; median vitta slightly wider than lateral vittae and blunt posteriorly. Postnotum shining black. Scutellum yellow with a narrow black band at base and a black spot at apex. Setulae and setae on thorax black; pprn s absent; 1 a spal s, 1 pal s, 1 i al s, 1 pscl acr s, 2 scl s; 2 npl s and 4 scap s. Legs mainly fulvous; coxae and trochanters dark brown to black; all femora dark brown to black apically; outer surface of fore tibia and bases of mid and hind tibiae dark brown. Mid tibia without apical spur. Wing (Fig. 6) largely hyaline; costal band dark brown,

* Corresponding author, E-mail: dyangcan@yahoo.com.cn

Received 24 Jan. 2011, accepted 17 Mar. 2011.



Figs 1–9. *Bactroera (Zeugadacus) apicinigra* Yu, Bai et Yang, sp. nov., ♂. 1. Adult of male in dorsal view. 2. Adult of male in lateral view. 3. Head in dorsal view. 4. Facial band. 5. Scutum. 6. Wing. 7. Adult of male abdomen in dorsal view. 8. Sternite 5. 9. Epandrium, cercus and surstyli in profile.

confluent with R_{2+3} and almost the same width throughout; anal streak broad and extending to posterior margin; cells bc and c colourless; microtrichiae located only at outer corner of cell c, dense setulae covering $A_1 + CuA_2$. Supernumerary lobe developed. Halter yellowish.

Abdomen (Fig. 7) oval, fulvous; tergites free. Tergite 1 and sternites 1–2 wider than long. Tergites 2–3 with a complete or not black anterior band and black lateral margin; a narrow complete black anterior band present on tergite 3, pecten of cilia present on posterior margin of tergite 3; tergites 3–5 with a moderately wide medial longitudinal black stripe. A

pair of quadrate black spots present on lateral margin of tergite 4; a pair of triangular black spots present on lateral margin of tergite 5; a pair of oval fulvous shining spots on tergite 5. Sternites black except sternite 2 fulvous. Setulae and setae on abdomen black. Sternite 5 (Fig. 8) slightly concave on posterior margin. Posterior lobe of surstyli long (Fig. 9).

Female. Unknown.

Etymology. The specific name refers to the black apices of the mid and hind femora.

Holotype ♂, Yunnan, Mengla (21.4° N, 101.5° E), Aug. 2009, BAI Yong-Hua. Paratype 1 ♂, same data as holotype.

Distribution. China (Yunnan).

Remarks. The new species is somewhat similar to *B. (Z.) diaphora* (Hendel) from Taiwan in the following characters: lower portion of face with a broad black band; scutum shining black in ground color, with three postsutural yellow vittae; scutellum with a black spot at apex. It can be separated from the latter by the following characters: all femora dark brown to black apically; wing with a costal band confluent with R_{2+3} and almost the same width throughout; abdomen predominantly fulvous. But in *B. (Z.) diaphora*, the entire fore femur, apical 2/3 of the mid femur and apical 1/2 of the hind femur are black; the wing has a narrow costal band confluent with R_{2+3} and moderately widen at apex; the abdomen is predominantly black (Hendel, 1915; Wang, 1996).

***Bacterodacus (Zeugodacus) hekouana* Yu, He et Yang, sp. nov. (Figs 10–17)**

Description. Male. Body length 6.0–6.5 mm, wing length 5.1–5.7 mm.

Head (Fig. 12) fulvous. Frons fulvous, anteromedially with fuscous hump and a few short setulae on hump; ocellar triangle black; a black mark extending across vertex and connecting with ocellar triangle; lunule black brown; face (Fig. 13) fulvous with one pair of long oval black facial spots; gena fulvous; a dark brown spot below each eye; occiput dark brown, but yellow along eye margins. Setulae and setae on head black; 3 fr s, 1 orb s, with dark brown spots at base of fr s and orb s; 1 i vt s, 1 o vt s and 1 gn s. Occipital row with some black setae. Antenna yellow except segment 3 fulvous on apex and outer surface; segment 1 with a few brown setulae dorsally, segment 2 with 1 black seta, segment 3 3–4 times longer than wide; arista bare, black but yellow basally; length of antennal segments: 0.10 mm, 0.27 mm, 0.71 mm. Proboscis fuscous; palpus fulvous.

Thorax (Fig. 14). Scutum shining black in ground color, postpronotal lobes entirely yellow. Pleuron predominantly black with following yellow markings: notopleuron, medium anepisternal stripe, small spot on katepisternum, upper portion of anatergite and katatergite, median postsutural vitta and lateral vittae. Two mid lateral vittae parallel, ending at base of ial s and connecting with suture; median vitta narrow at both ends. Postnotum shining black. Scutellum yellow with a narrow black band at base and with or without a small black spot at apex. Setulae and setae on thorax black; pprn s absent; 1 a spal s, 1 pal s, 1 ial s, 1 psctl acr s and 2 sctl s; 2 npl s and 4 scap s. Legs mainly yellow; coxae and trochanters dark brown; entire fore femur and apical 1/3 of mid and

hind femora shining black; bases of fore and mid tibiae fuscous; hind tibia dark brown; tarsi fuscous. Mid tibia with a red brown apical spur. Wing largely hyaline; costal band dark brown, confluent with R_{2+3} and interrupted at apex of R_{2+3} and expanded into a large spot at apex of R_{4+5} ; anal streak broad and extending to posterior margin; cells bc and c colourless; microtrichiae located only at outer corner of cell c, dense setulae covering $A_1 + CuA_2$. Supernumerary lobe developed. Halter yellowish.

Abdomen (Fig. 15) oval, tergites free. Tergite 1 and sternites 1–2 wider than long. Ground color black. Apex of tergites 1–2 with fulvous band; pecten of cilia present on posterior margin of tergite III; submedian yellow to fulvous spots on tergites 3–4. A pair of oval fulvous shining spots on tergite 5. Sternites 1, 3–5 dark brown to black; sternite 2 yellowish. Setulae and setae on abdomen black. Sternite 5 (Fig. 16) slightly concave on posterior margin. Posterior lobe of surstyli (Fig. 17) long.

Female. Unknown.

Etymology. The species is named after the type locality Hekou.

Holotype ♂, Yunnan, Hekou (22.4° N, 103.9° E), 2010, HE Wan-Zhong and LIU Li-Yi. Paratype 1 ♂, same data as holotype.

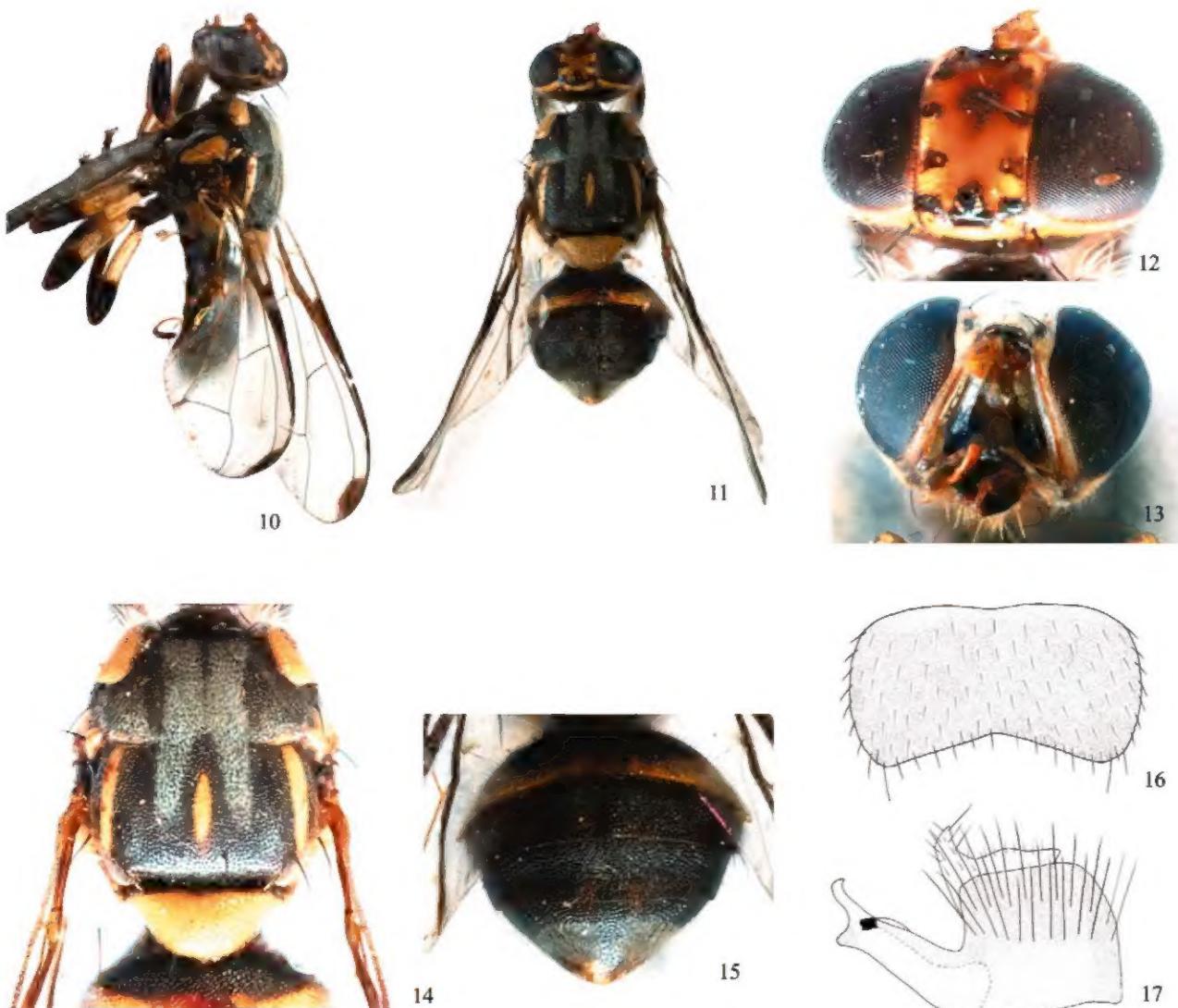
Distribution. China (Yunnan).

Remarks. The new species is somewhat similar to *B. (Z.) diaphora* (Hendel) from Taiwan in the following characters: scutum shining black in ground color; scutum with three postsutural yellow vittae; entire fore femur and apices of mid and hind femora black; abdomen largely black. It can be separated from the latter by the following characters: face with two black spots; wing with costal band confluent with R_{2+3} , interrupted at apex of R_{2+3} and expanded into a large spot at apex. But in *B. (Z.) diaphora*, the face entirely or lower 1/3–1/2 is black; the wing has a narrow costal band confluent R_{2+3} and moderately widen at apex (Hendel, 1915; Wang, 1996).

***Bacterodacus (Zeugodacus) menglana* Yu, Liu et Yang, sp. nov. (Figs 18–24)**

Description. Male. Body length 5.9 mm, wing length 5.5 mm.

Head (Fig. 18) fulvous. Frons fulvous, anteromedially with fuscous hump and a few short setulae on hump; ocellar triangle black; a black brown mark extending across vertex and connecting with ocellar triangle; lunule black; face (Fig. 19) fulvous with a long black band extending to upper portion of gena; gena fulvous; a dark brown spot below each eye; occiput brown, but yellow along eye margins. Setulae and setae on head black; 3 fr s, 1 orb s, with dark brown spots at base of fr s and orb s; 1 i vt s, o



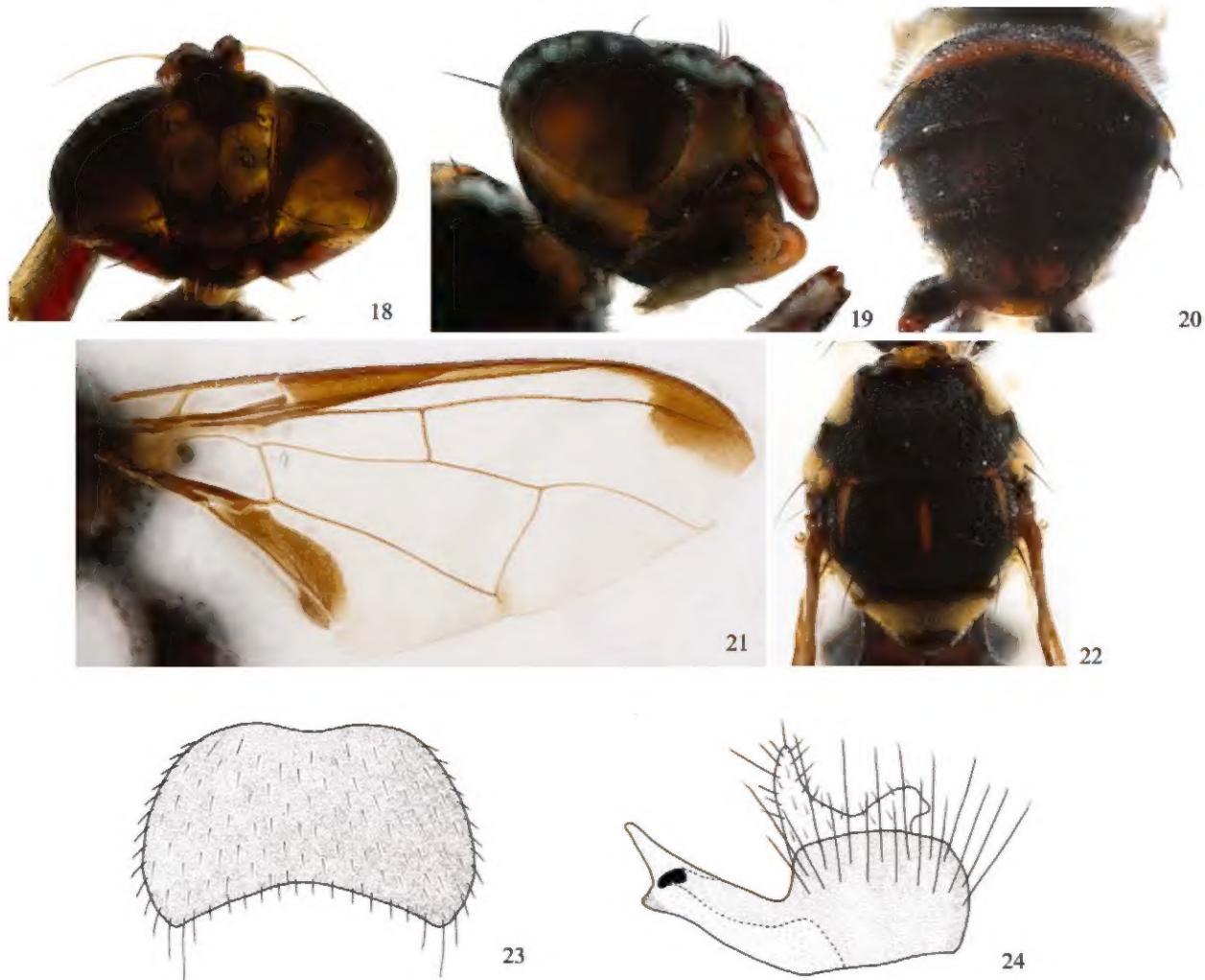
Figs 10–17. *Bactrocera (Zeugadacus) hekouana* Yu, He *et* Yang, sp. nov., ♂. 10. Adult of male in dorsal view. 11. Adult of male in lateral view. 12. Head in dorsal view. 13. Facial spots. 14. Scutum. 15. Adult of male abdomen in dorsal view. 16. Sternite 5. 17. Epandrium, cercus and surstyli in profile.

vt s and 1 gn s. Occipital row with some black setae. Antenna red brown; segments 1 and 2 with a few brown setulae dorsally, segment 3 3–4 times longer than wide; arista bare, black but yellow basally; length of antennal segments: 0.11 mm, 0.28 mm, 0.63 mm. Proboscis black brown; palpus fulvous.

Thorax (Fig. 20). Scutum shining black in ground color, postpronotal lobes yellow but anteromedial corners black. Pleuron predominantly black with following yellow markings: notopleuron, posterior portion of anepisternal, upper portion of anatergite and katatergite, median postsutural vitta and lateral vittae. Two mid lateral vittae slightly narrow at apex, ending at base of ial s and connecting with yellow mark on each side before suture; median vitta narrow at both ends. Postnotum shining black. Scutellum yellow with a narrow black band at base and with a black spot at apex. Setulae and setae on thorax

black; pprn s absent; 1 a spal s, 1 pal s, 1 ial s and 1 pscl acr s; 2 scap s, 2 npl s and 4 scl s. Legs mainly yellow; coxae and trochanters brown; entire fore femur and apical 4/5 of mid and hind femora shining black; basal 1/5 of fore and mid tibiae and apical 3/5 of hind tibia brown; tarsi fulvous. Mid tibia with a black apical spur. Wing (Fig. 21) largely hyaline; costal band dark brown, confluent with R_{2+3} , narrowed at the end of R_{2+3} and expanded into a large spot at apex of R_{4+5} ; anal streak broad and extending to posterior margin; cells bc and c colourless; microtrichiae located only at outer corner of cell c, dense setulae covering $A_1 + CuA_2$. Supernumerary lobe developed. Halter yellowish.

Abdomen (Fig. 22) oval, tergites free. Tergite 1 and sternites 1–2 wider than long. Ground color black. Posterior margin of tergites 1–2 with fulvous band; pecten of cilia present on posterior margin of



Figs 18–24. *Bactrocera (Zeugadacus) mengiana* Yu, Liu et Yang, sp. nov., ♂. 18. Head in dorsal view. 19. Facial band. 20. Scutum. 21. Wing. 22. Adult of male abdomen in dorsal view. 23. Sternite 5. 24. Epandrium, cercus and surstyli in profile.

tergite 3. A pair of oval fulvous shining spots on tergite 5. Sternites 1, 3–5 red brown to black; sternite 2 yellowish. Setulae and setae on abdomen black. Sternite 5 (Fig. 24) slightly concave on posterior margin. Posterior lobe of surstyli (Fig. 23) long.

Female. Unknown.

Etymology. The species is named after the type locality Mengla.

Holotype ♂, Yunnan, Mengla (21.4° N, 101.5° E), Aug. 2009, BAI Yong-Hua.

Distribution. China (Yunnan).

Remarks. The new species is somewhat similar to *B. (Z.) scutellaris* (Bezzi) from India in the following characters: scutum shining black in ground color, with three postsutural yellow vittae; scutellum with a black spot at apex; apices of mid and hind femora black; abdomen largely black. It can be separated from the latter by the following characters: face with a long black band; fore femur shining black; costal band of wing expanded into a large spot at apex. But in *B.*

(Z.) scutellaris, the face has two black spots; apical 1/2 of the fore femur is black; the costal band of the wing is slightly expand at apex (Bezzi, 1913; Wang, 1996).

Acknowledgements We express our sincere thanks to Dr. CHEN Nai-Zhong, Dr. ZHANG Jun-Hua for their help during the study.

REFERENCES

- Bezzi, M. 1913. Indian Trypaneids (fruit-flies) in the collection of the Indian Museum, Calcutta. *Mem. Indian Mus.*, 3: 53–175.
- Drew, R. A. I. 1989. The tropical fruit flies (Diptera: Tephritidae: Dacinae) of the Australasian and Oceanian Regions. *Mem. Queensl. Mus.*, 26: 1–521.
- Hendel, F. G. 1915. H. Sauter's Formosa-Ausbeute. Tephritinae. *Ann. Hist. Nat. Mus. Natl. Hung.*, 13: 424–467.
- Hendel, F. G. 1927. 49. Tryptidae. In: Lindner, E. (eds.), *Die Fliegen der Palaearktischen Region*, 5: 1–128.
- Thompson, F. C. 1998. Fruit fly expert identification system and systematic information database. *The International Journal of the North American Dipterists' Society*, 9: 1–524.
- Wang, X-J. 1996. The fruit flies (Diptera, Tephritidae) of the East

Asian region. *Acta Zootax. Sinica*, 21 (Suppl.): 1–338. [动物分类学报]
White, I. M., Headrick, D. H., Norrbom, A. L. et al. 1999.

Glossary. In: Aluja, M. and Norrbom, A. L. (eds.), *Fruit Flies (Tephritidae): Phylogeny and Evolution of Behavior*. CRC Press, Boca Raton. pp. 881–924.

中国云南簇果实蝇亚属三新种记述 (双翅目, 实蝇科)

余慧^{1,2} 白永华³ 何万忠⁴ 刘忠善⁵ 杨定^{2*}
 1. 中国检验检疫科学研究院动植物检疫研究所 北京 100029
 2. 中国农业大学农学与生物技术学院昆虫系 北京 100193
 3. 勐腊出入境检验检疫局 勐腊 666300
 4. 河口出入境检验检疫局 河口 661300
 5. 云南出入境检验检疫局 昆明 650228

摘要 本文记述了簇果实蝇亚属云南3新种。新种模式标本保存于中国检验检疫科学研究院动植物检疫所, 北京。

端黑果实蝇, 新种 *B. (Z.) apicinigra* Yu, Bai et Yang, sp. nov. (图1~9)

新种与 *B. (Z.) diaphora* (Hendel) 相似, 但足股节端部黑, 翅前缘带全长几近等宽。

正模♂, 云南勐腊, 2009-08, 白永华采。副模1♂, 同正模。

词源: 新种据其特征中后股节端部黑而定名。

河口果实蝇, 新种 *B. (Z.) hekouana* Yu, He et Yang, sp. nov. (图10~17)

关键词 双翅目, 实蝇科, 新种, 云南, 中国。

中图分类号 Q969.456.8

新种与 *B. (Z.) diaphora* (Hendel) 相似, 但颜具两黑斑; 翅前缘带在 R_{2+3} 端部中断, 翅端扩大成斑。

正模♂, 云南河口, 2010, 和万忠、刘立毅采。副模1♂, 同正模。

词源: 新种据其采集地而定名。

勐腊果实蝇, 新种 *B. (Z.) menglana* Yu, Liu et Yang, sp. nov. (图18~24)

新种与 *B. (Z.) scutellaris* (Bezzi) 相似, 但颜具黑横带; 前股黑亮; 翅前缘带在翅端扩大成斑。

正模♂, 云南勐腊, 2009-08, 白永华采。

词源: 新种据其采集地而定名。

* 通讯作者, E-mail: dyangcau@yahoo.com.cn